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Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.06/RS/CSR-07/082g/CEMENT/2016-17 Date: 04.07.2016

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer**, Byatarayanapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.
*NAME OF THE WORK	:	Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.
*REFERENCE	:	EE/BTP/BBMP/E-PMT/ /2015-16
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	02.07.2016
PERIOD OF TESTING	:	02.07.2016 to 04.07.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	28.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	140 Minutes	Not Less than 30 Minutes
•	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	485 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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VISHWANATH .C
Quality Manager

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Job No.: CTCE/BBMP/W.No.06/RS/CSR-07/082g/SAND-Gradation/2016-17 : 04.07.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

* Customer : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

* Agency : **Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.

* Name of Work : Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/ /2015-16

Technical Reference : IS : 2386 Part 1 - 1963 RA-2007

Sample ID : Fine Aggregates

Sample Received on : 02.07.2016

Date of Testing : 04.07.2016

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	95.80	90-100	90-100	90-100	95-100
2.36	76.60	60-95	75-100	85-100	95-100
1.18	53.10	30-70	55-90	75-100	90-100
600 Micron	23.30	15-34	35-59	60-79	80-100
300 Micron	10.80	5-20	8-30	12-40	15-50
150 Micron	4.80	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

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Remarks : This sample is under Zone-I specific limits.

AE-06 Nla

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VISHWANATH .C
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Assistant Executive Engineer
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Job No.: CTCE/BBMP/W.No.06/RS/CSR-07/082g/AGG/GR/2016-17 : 04.07.2016

TEST REPORT ON DETERMINATION GRADATION OF COARSE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	: **Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.
* Name of Work	: Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/ /2015-16
Technical Reference	: IS : 2386 Part 1 -1963 RA-2007
Sample ID	: Coarse Aggregates (40mm)
Sample Received on	: 02.07.2016
Date of Testing	: 04.07.2016

Total Wt. of Aggregates in gms= **7000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	97.86	95-100	85-100
20	40.00	30-70	0-20
10	16.43	10-35	0-5
4.75	2.29	0-5	-

* Information is furnished by the Customer/Representative

Remarks : This sample is under Graded specific limits.

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Job No CTCE/BBMP/W.No.06/RS /STEEL/2016-17 04.07.2016

TEST REPORT ON REINFORCEMENT STEEL

Customer	:	**Asst. Executive Engineer**, Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	:	**Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.
Name of the Work	:	Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/ /2015-16
Date of Test	:	04.07.2016
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm^2	Tensile strength (Ultimate stress) N/mm^2	Elongation percent gauge length		
1	12	0.89	515	558	13.40	O.K	O.K

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Job No.: CTCE/BBMP/W.No.06/RS/CSR-07/082g/CUBE/2016-17 19.07.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	: **Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.
* Name of the work	: Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	: EE/BTP/BBMP/E-PMT/ /2015-16
* Sample ID	: Drain Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
* Grade of Concrete	: M_{20}
Compressive Strength as on	: 7th day
Sample Received on	: 19.07.2016

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	12.07.2016	19.07.2016	8.188	333.9	14.84
2	12.07.2016	19.07.2016	8.290	340.2	15.12
3	12.07.2016	19.07.2016	8.380	358.2	15.92

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Job No.: CTCE/BBMP/W.No.06/RS/WMM/Gradation/2016-17 : 08.07.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.

Name of Work : Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/ /2015-16

Date of Testing : 08.07.2016

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **7685**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	185	185	2.4	97.6	95-100
22.4	2470	2655	34.5	65.5	60-80
11.2	1180	3835	49.9	50.1	40-60
4.75	1020	4855	63.2	36.8	25-40
2.36	930	5785	75.3	24.7	15-30
0.600	920	6705	87.2	12.8	8-22
0.075	685	7390	96.2	3.8	0-8

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Job No.: CTCE/BBMP/W.No.06/RS/WMM/Gradation/2016-17 : 09.07.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.

Name of Work : Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/ /2015-16

Date of Testing : 09.07.2016

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **8850**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	250	250	2.8	97.2	95-100
22.4	2895	3145	35.5	64.5	60-80
11.2	1255	4400	49.7	50.3	40-60
4.75	1085	5485	62.0	38.0	25-40
2.36	1000	6485	73.3	26.7	15-30
0.600	965	7450	84.2	15.8	8-22
0.075	910	8360	94.5	5.5	0-8

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Job No.: CTCE/BBMP/W.No.06/RS/WMM/Gradation/2016-17 : 11.07.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.

Name of Work : Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/ /2015-16

Date of Testing : 11.07.2016

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **7585**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	125	125	1.6	98.4	95-100
22.4	2350	2475	32.6	67.4	60-80
11.2	1285	3760	49.6	50.4	40-60
4.75	965	4725	62.3	37.7	25-40
2.36	915	5640	74.4	25.6	15-30
0.600	855	6495	85.6	14.4	8-22
0.075	800	7295	96.2	3.8	0-8

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Job No.: CTCE/BBMP/W.No.06/RS/WMM/AIV/2016-17 08.07.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.
Name of the Work	Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/ /2015-16
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	08.07.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	392	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	303	
4	Aggregate Impact value = percent fines	22.62	22.70	
	100* (W_2/W_1)%			22.35

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.06/RS/WMM/S-T/2016-17 08.07.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.
Name of Work	Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/ /2015-16
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	08.07.2016

Result : Flakiness Index = **12.35%**

Elongation Index = **13.28%**

Result : Combined Flakiness & Elongation index **25.63%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.06/RS/SDBC/Bitumen/2016-17 19.07.2016

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.
NAME OF THE WORK	Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/ /2015-16
SAMPLE I/D	Roads in Anam Enclave in Ward 06
DATE OF TESTING	19.07.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475.5	473.5
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	24.5	26.50
7. Bitumen content in %	4.90	5.30
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	34.15	7.18	7.18	92.82	90-100
4.75	260.3	54.74	61.92	38.08	35-51
2.36	35.56	7.48	69.40	30.60	24-39
1.18	40.22	8.46	77.86	22.14	15-30
0.3	45.25	9.52	87.38	12.62	9-19
0.075	31.22	6.57	93.94	6.06	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	33.26	6.65	6.65	93.35	90-100
4.75	260.5	52.10	58.75	41.25	35-51
2.36	56.36	11.27	70.02	29.98	24-39
1.18	45.65	9.13	79.15	20.85	15-30
0.3	35.15	7.03	86.18	13.82	9-19
0.075	40.22	8.04	94.23	5.77	3-8

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Job No.: CTCE/BBMP/W.No.06/RS/SDBC/AIV/2016-17 19.07.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.
Name of the Work	Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/ /2015-16
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	19.07.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	389	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	302	
4	Aggregate Impact value = percent fines $100^* (W_2/W_1)\%$	22.16	22.37	22.26

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

Note:

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Þ Any Query regarding the report must be reported within 30 days from the date of testing.

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Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

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Job No.: CTCE/BBMP/W.No.06/RS/SDBC/Shape_T/2016-17 : 19.07.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	: **Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.
Name of Work	: Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/ /2015-16
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 19.07.2016

Result : Flakiness Index = **11.92%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **25.17%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.06/RS/SDBC/Stripping/2016-17 19.07.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.
Name of the work	Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/ /2015-16
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	19.07.2016

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.4	3.50	96.50
2	3.5		
3	3.6		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.06/RS/SDBC/Sp_Wa/2016-17 19.07.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. R. Satheesh (M/s. Sathya Construction),** No.600, Down Bazaar Road, Yelahanka, Bangalore – 64.
Name of the Work	Improvements to Roads and Drains at Anam Enclave in Ward 06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/ /2015-16
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	19.07.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2011	2013	2015	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1256	1258	1260	
4	Weight of saturated surface dry aggregate in air	W_3 g	2021	2023	2025	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	765	765	765	
6	Weight of oven dried aggregate	W_4 g	2009	2010	2011	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.626	2.627	2.629	2.627
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.668	2.673	2.678	2.673
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.60%	0.65%	0.70%	0.65%

Comments:

Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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